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# *Effective Strategies for Optimizing Scientific and Technological Innovation in Business Administration Structure of Enterprises*

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***Keywords:*** Science and technology innovation, business administration structure, enterprise optimization, innovation strategy, organizational change, competitive advantage

***Abstract:*** Against the background of increasingly fierce global competition, science and technology innovation has become an important driving force for enterprises to optimize their business management structure. This paper examines the key role of science and technology innovation in promoting the change of enterprise management mode, improving organizational efficiency and enhancing competitiveness, and analyzes the current challenges faced by enterprises in the process of implementing innovative technologies. Through the analysis of the current situation of enterprise science and technology innovation application and the summary of typical cases, this paper proposes a series of optimization strategies, including the integration of technological resources, the construction of innovation management culture, the enhancement of organizational flexibility and the optimization of talent introduction mechanism, in order to promote the continuous improvement of the enterprise management structure. The study shows that science and technology innovation can not only significantly improve the management effectiveness of enterprises, but also provide sustainable strategic support for enterprises to cope with the complex market environment.

## 1. Introduction

Against the background of accelerated globalization and rapid development of digital economy, the market environment faced by enterprises has become more complex and competition is intensifying[1]. In this situation, the traditional business management structure gradually exposes limitations such as low management efficiency, slow market response, and inflexible resource allocation, making it difficult to meet the needs of rapid development of modern enterprises. Science and technology innovation, as an important driving force for enterprises to enhance their competitiveness, especially with the wide application of big data, artificial intelligence, blockchain and other cutting-edge technologies, has provided enterprises with brand-new management tools and solutions, and promoted a profound change in the management mode and organizational structure of enterprises[2].

Optimizing the business management structure of enterprises is not only a key way to enhance their ability to adapt to market changes and improve their core competitiveness, but also helps to

build an innovation-driven sustainable development model[3]. However, in the process of promoting scientific and technological innovation and optimizing management structure, enterprises often face a series of challenges, such as high technology costs, shortage of talents and poor organizational adaptability[4]. Therefore, how to effectively integrate S&T innovation resources, improve management processes, enhance organizational flexibility and build a corresponding innovation culture has become an important issue for enterprises to address[5]. The research objective of this paper is to explore the application strategy of science and technology innovation in optimizing the business management structure of enterprises, and to propose practical optimization measures and improvement plans by analyzing the current situation of the actual application of enterprises in the process of innovation and the main challenges they face[6]. It is hoped that this study can provide guidance for enterprises in building innovative management structure, improving organizational efficiency, coping with uncertainty, etc., and provide useful reference for realizing the deep integration of science and technology and management.

## 2. The impact of science, technology and innovation on the business administration structure of enterprises

Technological innovation has greatly improved the efficiency of enterprise management. Through big data analysis, artificial intelligence algorithms and automation technologies, enterprises are able to process large amounts of business data more quickly and accurately and optimize management processes[7]. For example, data analysis tools can help management quickly access business dynamics and market changes, and intelligent automation processes can reduce the time consumption of repetitive work and improve resource allocation efficiency[8]. This not only reduces management costs, but also enhances the quality of management's decisions, bringing significant management efficiency improvements to the organization. Formula for Return on Investment (ROI):

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Cost of Investment}} \times 100 \tag{1}$$

Science and technology innovation has promoted changes in organizational structure, enabling enterprises to better adapt to the changing market environment[9]. Taking flat organizational structure as an example, with the help of scientific and technological innovation, enterprises can reduce the intermediate layers, strengthen the communication and collaboration between departments through information technology, so as to speed up the flow of information and decision-making speed[10]. This flat management structure enhances the flexibility of enterprises, enabling them to respond quickly to rapidly changing market demands and avoiding the lengthy processes and information barriers of traditional management structures, showed in Figure 1 :

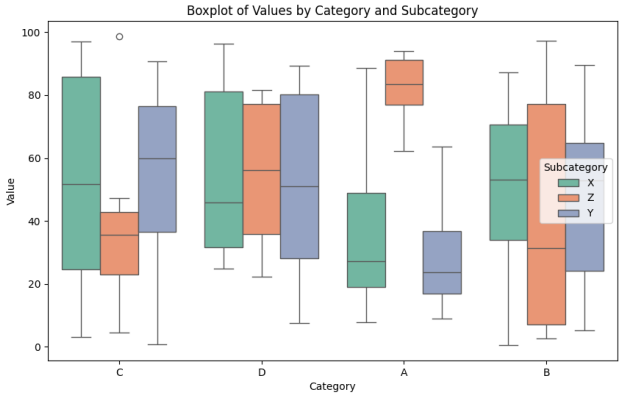


Figure 1: Boxplot of Values by Category and Subcategory

Science, technology and innovation create opportunities for enterprises to enhance their competitive advantage. By embedding innovative technologies in their products and services, enterprises can better meet customer needs and enhance customer experience and brand competitiveness. For example, intelligent customer management systems can help enterprises analyze customer preferences and needs more accurately so as to optimize personalized services. In addition, blockchain technology can improve the transparency and security of the transaction process and further enhance customer trust, which has a positive effect in maintaining brand loyalty and attracting new customers.

Scientific and technological innovation has also brought about a change in management concepts, making enterprises pay more attention to data-driven and continuous innovation. Different from the traditional management style of relying on experience to make decisions, the data-driven management mode enables enterprises to base their decision-making process on comprehensive data analysis and improve the scientific nature of decision-making. At the same time, the concept of rapid iteration and continuous improvement emphasized by science and technology innovation has gradually penetrated into the management culture of enterprises, pushing them to continuously innovate themselves to adapt to changes in the external environment. The formation of this data-driven management style and innovation culture will become an important support for the sustainable development of enterprises in the future.

## 3. The application of scientific and technological innovation in the business management structure of enterprises

The application of science, technology and innovation in the business management structure of enterprises is becoming more and more extensive and in-depth. In order to better utilize the value of science, technology and innovation, enterprises have taken a number of measures in technology application, challenge response and innovation practice, optimizing the management process through the introduction of technology, overcoming obstacles in the process of innovation, and realizing the in-depth fusion of science, technology and management by combining with practical cases.

### 3.1. Analysis of the current status of technology applications

With the popularization of big data technology, enterprise management is gradually moving towards a data-driven model. Through big data analysis, enterprises can collect and process a large amount of market information, user feedback and operational data in real time, providing management with accurate decision support. This data-driven management mode not only improves the speed of information acquisition, but also enhances the sensitivity of enterprises to market dynamics, enabling them to more effectively predict market demand and adjust their strategies in a timely manner. Formula for the Compound Annual Growth Rate (CAGR):

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}}\right)^{\frac{1}{n}} - 1 \tag{2}$$

The application of Artificial Intelligence in business management has significantly improved operational efficiency and management intelligence. Artificial intelligence technology has been widely used in areas such as customer service, process automation and human resource management. For example, by introducing intelligent customer service systems, enterprises can respond to customer needs in a shorter period of time, reducing the labor costs of traditional customer service. In addition, automated processes can optimize repetitive work within the enterprise and reduce human errors, thus improving overall operational efficiency and management quality.

Blockchain technology has gradually been emphasized in enterprise management, especially in

the field of supply chain management and financial management, showing great potential. The decentralized and highly transparent characteristics of blockchain make the information flow of each link in the supply chain more open and traceable, effectively solving the problem of information asymmetry in supply chain management. Meanwhile, in financial management, blockchain technology can improve the security and transparency of transactions, reduce financial risks, and safeguard the safety of enterprise capital flow.

The converging applications of cloud computing and IoT technologies provide organizations with more flexible and efficient management tools. Cloud computing allows enterprises to store and process massive amounts of data at low cost and high efficiency, while the popularization of the Internet of Things closely connects the equipment, products and processes of enterprises. Through the collaborative application of cloud computing and IoT, enterprises are able to monitor and optimize the production process, equipment conditions, etc. in real time, realizing the intelligence of the whole process from data collection to management decisions. This combination of technologies not only improves management efficiency, but also provides enterprises with stronger market competitiveness.

## 3.2. Key challenges in the implementation of STI

The cost of technology is the primary challenge faced by enterprises in implementing STI. The introduction of advanced technologies often requires high investment in equipment and R&D, as well as supporting infrastructure support. Especially for small and medium-sized enterprises (SMEs), limited capital makes it difficult for them to afford ongoing technology development and upgrading costs. The high cost of technology makes many enterprises hesitant to introduce technological innovations, thereby missing out on competitive opportunities, showed in Figure 2 :

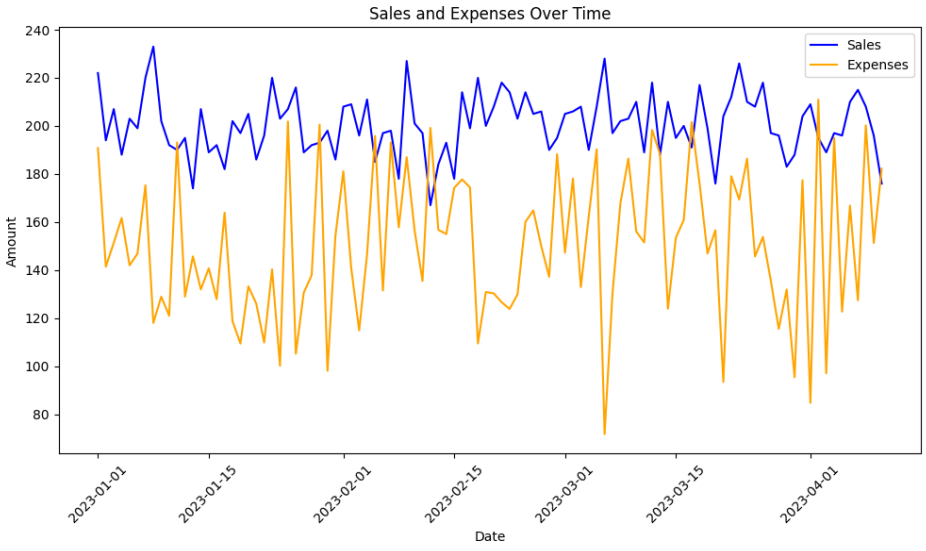


Figure 2: Sales and Expenses over Time

The lack of specialized talents seriously constrains the progress of technological innovation in enterprises. Science and technology innovation requires talents with a high level of specialized knowledge and skills, especially in areas such as artificial intelligence, big data and blockchain. However, due to the high demand and fierce competition in the market for technical experts in these fields, enterprises often find it difficult to attract and retain suitable talents, resulting in slow progress of innovation projects. In addition, even if they are capable of recruiting specialized talents, management and technical staff within the enterprise need to continuously learn new technologies in order to remain competitive in innovative applications.

The lack of organizational adaptability within enterprises is another major challenge to the implementation of STI. STI often brings about new work processes and management models, but traditional management structures and mindsets may have difficulty adapting to the changes brought about by innovation. For example, when implementing data-driven decision-making, enterprises may encounter obstacles from traditional management models, and some managers are skeptical about data dependency, which in turn affects the effective application of innovation results. Insufficient organizational adaptability not only affects the efficiency of science and technology innovation, but may also hinder the optimization of the enterprise management structure.

The issue of data security and privacy protection is also an important challenge that enterprises must face in the process of promoting technological innovation. With the application of technologies such as big data and the Internet of Things (IoT), enterprises need to deal with a large amount of sensitive data, including customer information and business secrets. Once these data are leaked, it will have a serious impact on an enterprise's reputation and market position. However, the awareness and technical means of data protection of many enterprises are still insufficient to effectively prevent data leakage and cyberattacks, thus increasing the risks in the process of science and technology innovation.

### 3.3. Conflict between STI and traditional management models

STI usually requires a more flexible and adaptable management structure, while traditional management models are often characterized by hierarchical and rigid processes. In the traditional management model, the decision-making process often requires multiple levels of approval, which leads to a slow flow of information and an inability to respond to market changes in a timely manner. In contrast, science and technology innovation encourages rapid iteration and flexible response, and enterprises need a flatter organizational structure to speed up decision-making and execution when implementing innovation. As a result, there is an obvious contradiction between the traditional management model and the flexibility required by STI.

While the traditional management model emphasizes stability and risk control, technological innovation is inevitably accompanied by uncertainty and risk. In the traditional management concept, enterprises usually adopt conservative strategies and try to avoid potential risks to ensure the stable operation of their business. However, STI is essentially an exploratory activity, and companies must accept failure and uncertainty in the innovation process. This different attitude towards risk leads to ideological conflicts between management and employees when enterprises promote technological innovation, which in turn affects the effectiveness of innovation implementation.

While traditional management models tend to focus on empirical and intuitive decision-making, STI emphasizes data-driven decision-making processes. In many traditional companies, management decisions rely on managers' experience and judgment rather than on the results of data-based analysis. This situation makes companies often slow to react when faced with market conditions that require quick decisions and responses to change. STI requires companies to extract insights from data and use them as a basis for making scientific decisions, a shift that challenges traditional management models that rely on experience.

Science and technology innovation often requires cross-departmental collaboration and communication, while traditional management models may lead to the emergence of information silos. In traditional enterprises, communication and collaboration between departments are often limited by clear delineation of responsibilities, making it difficult for information to flow effectively and forming "information silos". On the other hand, science and technology innovation requires close cooperation between different departments in order to integrate various resources and technologies. This cross-departmental collaboration requirement and the gap between traditional management

models make enterprises face cultural and communication challenges when implementing STI, which in turn affects the transformation and application of innovation results.

## 4. Effective Strategies for Optimizing Scientific and Technological Innovation in Business Administration Structure of Enterprises

Enterprises should establish a data-driven management decision-making mechanism and comprehensively improve management efficiency by introducing advanced data analysis tools. Utilizing big data technology, enterprises can monitor market dynamics, customer feedback and internal operations in real time, forming a data-supported decision-making system. Management should regularly conduct data analysis training so that employees can master data tools, thus improving their ability to apply them in practical work. This mechanism can not only improve the scientific and accuracy of decision-making, but also help enterprises to adjust their strategies in a timely manner and maintain their competitive advantages in the rapidly changing market environment.

Enterprises need to promote the flattening and flexibilization of their organizational structures in order to adapt to the rapid response capabilities required by technological innovation. By reducing the number of management levels and optimizing departmental functions, enterprises can improve the speed of information flow and enhance collaboration among departments. At the same time, enterprises should encourage the establishment of cross-departmental teams, so that employees with different professional backgrounds can cooperate around STI projects. This kind of structural adjustment not only helps to break down information silos and promote knowledge sharing, but also improves the team's innovation ability, enabling enterprises to adapt to market changes and technological development more quickly.

Enterprises should increase the introduction and cultivation of scientific and technological innovation talents and establish a continuous talent development mechanism. Through cooperation with universities and scientific research institutions, enterprises can attract excellent technical talents and enhance their innovation ability. In addition, enterprises should provide training and career development opportunities for their employees to enhance their technical level and innovation consciousness. The establishment of a good incentive mechanism, such as project rewards and promotion opportunities, can stimulate the creativity and initiative of employees, form an innovation-oriented corporate culture, and help the effective implementation of science and technology innovation.

Enterprises must pay attention to data security and privacy protection when advancing technology and innovation. With the deepening of science and technology innovation, enterprises are facing more and more data security challenges. Enterprises should establish a sound information security management system and introduce advanced security technologies to ensure data integrity and confidentiality. At the same time, data security training is regularly provided to employees to improve their security awareness and ensure that relevant laws and regulations are followed in the process of scientific and technological innovation. Through effective data security management, enterprises can reduce the potential risks brought about by scientific and technological innovation and safeguard the sustainable development of their business.

## 5. Conclusion

Science and technology innovation has a far-reaching impact on the optimization of enterprises' business management structure, which can not only enhance management efficiency and decision-making science, but also promote the flexibility and adaptability of organizational structure. The implementation of science and technology innovation is faced with technology costs, talent shortages, lack of organizational adaptability and data security, and effective strategies must be adopted when

promoting science and technology innovation, including the establishment of a data-driven decision-making mechanism, the optimization of the organizational structure, the intensification of talent cultivation and the introduction of talents, and the strengthening of data security management.

Through the comprehensive application of these strategies, enterprises can not only effectively respond to current challenges, but also occupy a favorable position in future competition. Facing the rapidly changing market environment, continuous scientific and technological innovation will be the key driving force for enterprises to realize sustainable development. Ultimately, only by closely integrating scientific and technological innovation with business management structure can enterprises be invincible in the fierce market competition and create greater value and opportunities.

## References


*[1] Zhou Y, Xu Y, Yu W,et al.On Optimal Fronthaul Compression and Decoding Strategies for Uplink Cloud Radio Access Networks[J].IEEE Transactions on Information Theory, 2016, 62(12):7402-7418.DOI:10.1109/ TIT.2016. 2617862.*

*[2] Courter J D, Kuti J L, Girotto J E,et al. Optimizing bactericidal exposure for beta-lactams using prolonged and continuous infusions in the pediatric population.[J].Pediatric Blood & Cancer, 2010, 53(3):379-385.DOI:10. 1002/ pbc. 22051.*

*[3] Azmi M H, Yuan J, Lechner G,et al.Design of Multi-Edge-Type Bilayer-Expurgated LDPC Codes for Decode-and-Forward in Relay Channels[J].IEEE Transactions on Communications, 2011, 59(11):2993-3006.DOI:10.1109/ TCOMM. 2011. 100411.100286.*

*[4] Silverio Alarcón, Mercedes Sánchez. Business strategies, profitability and efficiency of production[J].Spanish Journal of Agricultural Research, 2013, 11(1):19-31.DOI:10.5424/sjar/2013111-3093.*

*[5] Escobar-Rodriguez T, Monge-Lozano P.The acceptance of Moodle technology by business administration students[J].Computers & Education, 2012, 58(4):1085-1093.DOI:10.1016/j.compedu.2011.11.012.*

*[6] Himmelstein D U, Woolhandler S.Taking Care of Business: HMOs That Spend More on Administration Deliver Lower-Quality Care [J].International Journal of Health Services, 2002, 32(4):657-667.DOI:10.2190/JK74-14MB-YT5T-KUXQ.*

*[7] Carroll L.A study of narcissism, affiliation, intimacy and power motives among students in business administration [J].Psychological Reports, 1987, 61(2):355-358.DOI:10.2466/pr0.1987.61.2.355.*

*[8] Hosmer L R T. The other 338: Why a majority of our schools of business administration do not offer a course in business ethics[J].Journal of Business Ethics, 1985, 4(1):17-22.DOI:10.1007/BF00382669.*

*[9] Warning S, Wiermann C, Günther G. Schulze.What and How Long Does It Take to Get Tenure? The Case of Economics and Business Administration in Austria, Germany and Switzerland [J].Discussion Paper Series, 2010, 9(4):473-505.DOI:10.1111/j.1468-0475.2008.00450.x.*

*[10] Bean J J.Big Government and Affirmative Action: The Scandalous History of the Small Business Administration [J].Business History Review, 2013, 117(1):148-149.DOI:10.2307/798111.*